VOL. XVIII. SEPTEMBER, 1893. No. 9.

THE BOTANICAL GAZETTE

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[ISSUED SEPTEMBER 15.]

BLOOMINGTON, INDIANA.
PUBLISHED BY THE EDITORS.

Tracy, Gibbs & Co., Printers, Madison, Wisconsin.

THE BOTANICAL GAZETTE.

A Monthly Journal Embracing all Departments of Botanical Science.

ANNUAL SUBSCRIPTION, $2.50.

SINGLE NUMBERS, 25 CENTS.

The subscription price is an invariable one, no concession being made to dealers or agents.

In Great Britain, 11 shillings.	In Germany, 11 marks.
Agent, W. P. COLLINS,	Agents, R. FRIEDLÆNDER & SOHN,
157 Great Portland St., London, W.	Carlstrasse 11, Berlin, N. W. 6.

Subscriptions and business correspondence should be addressed to **JOHN M. COULTER, Lake Forest University, Lake Forest, Ill.**; money orders and drafts should be made payable to the BOTANICAL GAZETTE.

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[Entered at the Post-office at Bloomington, Ind., as second-class postal matter.]

In the October number will appear:

The fructification of Juniperus, by JOHN G. JACK, *Arnold Arboretum, Jamaica Plain, Mass.*

Development of the embryo sac in Acer rubrum, by D. M. MOTTIER, *University of Indiana, Bloomington.*

Achenial hairs of Compositæ, by MARY A. NICHOLS, *Iowa Agricultural College, Ames.*

BOTANICAL GAZETTE

SEPTEMBER, 1893.

Evolution and classification.[1]

CHARLES E. BESSEY.

As we have gathered up the scattered masses of botanical knowledge, laboriously wrought out by many isolated workers, and attempted to fit them together into a consistent whole, which should outline the structure of the temple of botany, we have found that the workmen have not always followed the same architectural plan, and have often used different units of measurement. With the increasing specialization so noticeable year by year there is a corresponding lack of coordination of work. To this lack of coordination, this want of unity of measurement, this misunderstanding of plan, we can no longer close our eyes, and I therefore feel free to invite your attention to the following somewhat summary discussion of the causes of the present unsatisfactory condition, in the hope that we may thereby be enabled to see how we may make some improvement.

All botanical knowledge finally culminates in some kind of classification. The facts of histology, morphology and physiology are of great biological importance, but the greatest of all biological facts is that the world is peopled with living things. We may group and arrange in orderly sequence the histological facts of the science; we may do likewise with the facts which the morphologist has discovered; we may make a classification of all the known physiological facts; but beyond and above these lies the greatest grouping of all, the grouping in orderly sequence of the organisms themselves, whose histology, morphology and physiology we have studied.

It is now a full third of a century since a great light was first turned upon all biological problems by the formulation of the doctrine of evolution by the master mind of Darwin. In

[1] Abstract of Vice-presidential address before Section G of the American Association for the Advancement of Science, Madison meeting, August, 1893.

its light many puzzles have been solved, and many facts hitherto inexplicable have been made plain. We now know what relationship means, and we have given a fuller meaning to the natural system of classification. From the new point of view a natural classification is not merely an orderly arrangement of similar organisms. It is an expression of genetic relationship. Furthermore in the light of evolution we now see the meaning of many reduced structures whose significance was not at all or but vaguely understood. We have become familiar with the fact that degradation is a prominent factor in the vegetable kingdom. Evolution has by no means always involved an advance in structural complexity. Often this catagenesis is a result of parasitism or saprophytism, as is so well illustrated in the fungi, where the degradation has gone so far that their relationship has to a great degree been obscured.

But there are many cases of a catagenesis not due to a dependent habit, in which we have evidence of a simplification from a more complex structure. Thus in the willows and poplars, where we have a raceme of very simple flowers, each consisting of a single ovary, or one to many stamens, it is readily seen that this simplicity is not primitive. The ovaries are not single carpels, but are composed of two or three united. The flower of a willow is simple by a degeneration from a higher type, probably a tricarpellary or pentacarpellary type, by the loss of its floral envelopes and stamens and pistils.

Every naturalist should be as familiar with these illustrations of evolution by simplification as he is with those of evolution by complication. In the growth of the great tree of life, while the development has been most largely in an upward direction so that the great body of the tree has risen far above its point of beginning, there are yet multitudes of twigs and branchlets which droop downward.

I need not now, before a body of scientific men, speak of evolution as an hypothesis, for we know it as a great biological fact, about whose existence there is no shadow of doubt. A natural classification will conform strictly to the lines of evolution, it will be in fact a clear exposition of the successive steps in its progress. In such a classification the primitive forms will precede the derived ones, and the relation of the latter will be positively indicated. Moreover, in such a sys-

tem there will be no confusion between the primitively simple forms and those which are so by derivation.

An examination of our common systems shows them sadly deficient in the essentials of a scientific classification. This is particularly true of the treatment of the flowering plants, at the hands of English and American botanists. Nothing could show better the conservatism of botanists than the fact that for a third of a century after the general acceptance of the doctrine of evolution, they are still using so crude an arrangement of the group of plants with which they are most familiar.

I may assume that it is well known to nearly all of us that the prevailing arrangement of the dicotyledons does not represent the later views of any of the systematists. The fact is that the systematic disposition of the higher plants is at present a make-shift, maintained by conservatism, and a reverence for the time-honored work of the fathers. It is unscientific to let our practice drag behind the present state of our knowledge: it is far more so for us to cling to the opinions of our fathers, through mere reverence, long after we know them to be untenable. It is not to the credit of our science that for a second time she has persistently held to a system through such considerations. For thirty or forty years after a natural system had been constructed by Jussieu, botanists as a body still adhered to the artificial system of Linné. Now sixty years later we find ourselves faced with a problem similar to that which Lindley, Torrey, Beck, and Gray met. History repeats itself with such exactness that with the change of a word here and there the arguments *pro* and *con* then used may be used to-day. The system of Jussieu and DeCandolle is now as much a clog and a hindrance to the systematic botany of the higher plants, as was that of Linné sixty years ago, and now, as then, it is the spirit of conservatism and of veneration for time honored usage which maintains the incubus.

Manifestly a system of classification which conforms to and is based upon the doctrine of evolution must begin with those forms which are primitive, or which, as nearly as may be, represent primitive forms. Since the flower is a shoot in which the phyllomes are modified for reproductive purposes, that flower in which the phyllomes are least modified must be regarded as primitive, while that in which there is most modification

must be regarded as departing most widely from the primitive type. The simple pistil, developed from a single phyllome is primitive and lower, the compound pistil is derived and higher. The several-seeded, compound ovary must be lower, and the compound ovary with but one seed must be higher. Separate stamens are primitive; united stamens, whether the union be with one another or with other structures, must be derived and consequently higher. So too when all parts of the flower are separate it is a primitive condition, and when they are united it is a derived structure.

Applying these principles to the flowering plants it becomes evident that in the dicotyledons either the Apetalæ or the Polypetalæ must furnish our starting point. The Gamopetalæ are universally admitted to be higher than the groups just mentioned, and certainly do not contain the sought for primitive types. Even a hasty examination of the thirty-six apetalous families shows that they are, at least to a very large extent, derived from the Polypetalæ by the abortion of some parts, and the entire omission of others. It will not be difficult to determine that the Ranales must take rank below all other Polypetalæ, in the sense of representing more nearly than any other group the primitive dicotyledons.

The attempt to make a natural system by linking family to family in a long undulating chain, by concatenation, is unscientific because it absolutely fails to conform to the laws of evolution. We must abandon the old classification and attempt one which in the light of evolution is rational. Let us not cling to the old because it is inconvenient to change, let us not cling to it through a mistaken reverence for the practice of the fathers, let us not cling to it as long as a flaw may be found in a new system. Science is ever abandoning the old, when the old is no longer the true; it tears down the work of years, when that work no longer represents the truth; and it dares to reach out and frame a rational system even though some parts of it for a time rest upon hypothetical grounds.

A revised arrangement of the Benthamian "series" of flowering plants.

Monocotyledons.

1. Apocarpæ.
2. Coronarieæ.
3. Nudifloræ.
4. Calycinæ.
5. Glumaceæ.
6. Hydrales. (Hydrocharideæ).
7. Epigynæ.
8. Microspermæ.

Dicotyledons.

"POLYPETALÆ."

1. Thalamifloræ. (Including the apetalous Curvembryeæ, Micrembryeæ, and "Ordines anomali" and the Euphorbiaceæ and Urticaceæ, etc., of the Unisexuales.)
2. Disciflorae. (Including the apetalous Daphnales and the Juglandaceæ and Cupuliferæ, etc., of the Unisexuales.)
3. Calycifloræ. (Including the apetalous Aristolochiaceæ and Cytinaceæ).

GAMOPETALÆ.

1. Heteromeræ. 2. Bicarpellatæ. 3. Inferæ.

University of Nebraska, Lincoln.

Proceedings of Section G, A. A. A. S., Madison meeting.

The American Association for the Advancement of Science convened in Madison, Wis., Thursday, August 17, 1893, and continued in session until the succeeding Tuesday. The following account is an outline of the addresses, papers and discussions before the section of botany, in the order in which they were presented.

THURSDAY AFTERNOON, AUGUST 17.

The address of Vice-President C. E. Bessey upon *Evolution and Classification* was given before the Section of Botany at half-past four o'clock, occupying one hour. An abstract of the address is printed in the preceding pages of this number.

FRIDAY MORNING, AUGUST 18.

The Section was called to order at 10:30 o'clock, Vice-President Bessey in the chair, and B. T. Galloway as secretary pro tem., with about forty persons present. The reading of papers began at once.

1. GEO. F. ATKINSON: *Photography as an instrument for recording the microscopic characters of micro-organisms in artificial cultures.*—In the usual method of lighting for photographing plate cultures, the finer characteristics are usually lost, and in case of very transparent colorless organisms the image is throughout very dim. By covering the bottom and

top of the culture dish with an opaque screen the light is admitted only through the sides of the dish, and the object is thus photographed by reflected, instead of transmitted light. In this way very clear and minute details are obtained. Many fine photographs illustrating the method and its superiority to the usual method were shown.

The paper was discussed by Messrs. Galloway and Lasché. The author stated that he used Petri dishes, and that he considered the method most serviceable in differentiation.

2. G. F. ATKINSON: *Symbiosis in the roots of Ophioglosseæ.*—In examining the roots of Botrychium Virginianum attention was called to masses of yellowish protoplasm located at definite points in the cortical parenchyma. From them threads extended to the outside, branching profusely in connection with the masses. Examination of large sets of Botrychium and Ophioglossum from all over the world revealed these structures in all. As root-hairs are not found in the Ophioglosseæ, it was suggested that this fungus was of great service in the work of absorption, and that probably this habit prevails in all Ophioglosseæ.

Discussed by Messrs. Smith (Erwin F.) and Swingle.

3. B. T. GALLOWAY: *Observations on a rust affecting the leaves of the Jersey or scrub pine.*—A full description of the rust (*Coleosporium Pini*) was given, and the course of its development, especially the conditions and time of its transformations were fully described. Infection only takes place when the leaves are tender, from one-fourth to one inch long, and is usually confined to a period not exceeding two weeks.

In the discussion Professor Kellerman said that the Jersey pine (Pinus Virginiana) was abundant in southern Ohio, from near Columbus southward, and was associated with the pitch pine (P. rigida). He had not found the fungus on the former species in that state, but it was common upon the pitch pine throughout the region. Professor MacMillan mentioned an unusual case of hypertrophy due to such a parasite, observed in Minnesota, in which trees twenty to thirty years old only attained the height of a man, the whole tree becoming a kind of witch's broom.

4. W. J. BEAL: *Prophylla of Graminæ.*—These structures were described, using corn and oats as examples. With a view to discovering their value as a diagnostic character, 150 species belonging to fifty-six genera were examined. The

conclusion was reached that while the lengths of prophylla hold some relation to the lengths of sheaths, the character of the apex is of chief service in classification, varying as it does from acuminate to bilobate. Such distinctions are sometimes specific, sometimes generic.

Discussed by Mr. Swingle, who suggested that prophylla show an adaptive character in the protection of young branch buds.

5. CHARLES R. BARNES: *On the food of green plants.*—A discussion of various nutritive processes, suggesting the proper application and restriction of the terms "digestion" and "assimilation," claiming that the true food of plants was not the "food" of ordinary reference, and proposing the application of the term "photosyntax" to the construction of carbon compounds under the influence of sunlight. [The paper will appear in full in the BOTANICAL GAZETTE.]

Discussed by Messrs. Britton, Smith (E. F.), Swingle and MacMillan.

FRIDAY AFTERNOON, AUGUST 18.

6. J. CHRISTIAN BAY: *A new infection needle for the study of lower plants.*—A pointed wire, about six inches long, bent around at one end to form a handle, and sharpened at the other, is thrust through a metal disc, an inch in diameter. The disc acts as a screen to prevent contamination from falling dust and germs when transferring infection to or from liquid cultures of micro-organisms.

7. G. F. ATKINSON: *Comparative study of the structure and function of the sporangia of ferns in the dispersion of spores.*—The nature of the annulus in various ferns was described, the spring cells, lip cells, and connective cells in each case being discussed, and attention called to the function of each one of these regions in reference to scattering spores. The question was also raised as to the proper application of the terms "complete" and "incomplete" in reference to the annulus.

8. BYRON D. HALSTED: *The Solandi printing applied to botanical work.*—The object to be reproduced is placed upon plain glass in an ordinary photographic printing frame, backed with Aristo, or other sensitive paper, and exposed to light in the usual way of making a photographic print. When the print is fixed with "hypo," it is made transparent with kerosene, and thus becomes a negative from which any number of positives may be printed. The process is suitable to fresh

leaves, sections of wood, and all kinds of thin semitransparent objects, including drawings and book illustrations. Dried leaves may be made sufficiently transparent by immersion in kerosene. If the object is moist, like fresh sections of fleshy tubers and roots, a sheet of mica can be laid between the object and the sensitive paper. Many beautiful examples of the diversified application of the process were shown. (The name is a fanciful compound of Sol-and-I.)

Discussed by Mrs. E. G. Britton, W. A. Kellerman and A. B. Seymour, who described photographic methods which they had used. The last had found two sheets of glass clamped together, when copying from bound books, quite as efficient as the printing frame, thus overcoming the necessity of cutting out the leaf.

9. N. L. BRITTON: *Present aspects of the nomenclature question.*—The paper was presented by request and consisted simply of a statement of the different views held in recent times, with no attempt to discuss their relative merits. With reference to genera, the various positions as to the date of their recognition were grouped as follows: (1) Pre-Linnæan (naturally subdividing into those who would recognize genera from the earliest possible date, and those who would carry them back as far as Tournefort), (2) 1735, (3) 1737, (4) 1753, (5) those who would use a more recent limitation. As to species, the two views are represented by those who would recognize binomials before the time of Linnæus, and those who would date them entirely from 1753.

Discussed by Mr. E. L. Greene, who did not contend for pre-Linnæan binomials, but for the practice of crediting such names as Linnæus adopted from former authors to the respective authors. Mr. Seymour called attention to the fact that this method was in use in quoting the names used by Fries, although in this case the authorities cited were all subsequent to Linnæus.

10. T. A. WILLIAMS: *Lichens of the Black Hills.*—A list was submitted containing eighty-three species and varieties, and the paper read considered only the subject of distribution. Of the eighty-three species forty-five are rock forms, eight are tree forms, twenty-one are earth forms, the remainder occupying combined localities. Comparisons were made with the lichens of eastern Nebraska and those of Idaho and the Yellowstone Park region as published in the report of the

Hayden Survey for 1872. The conclusion was reached that the Black Hills lichens are of northern mainly subalpine character, and while more closely allied to the Rocky Mountain flora, are intermediate between that and the flora of eastern Nebraska. The varying preponderance of tree, rock, and earth forms was attributed to certain geological and climatic conditions.

11. J. CHRISTIAN BAY: *The bibliography of American botanical literature.*—Attention was called to the advantages which would come from the publication of an index of American writings. Mr. Bay instanced the great value of the index of chemical literature conducted under the auspices of the Association. He offered the suggestion that Section G (Botany) appoint a committee to undertake the work.

Several members discussed the subject, but all thought that there was need of taking more time to fully consider the matter.

12. DOUGLAS H. CAMPBELL: *Notes on the development of Marattia Douglasii.*—The material for study was obtained during the author's recent visit to Hawaii. It was claimed that the study further strengthened the view that the eusporangiates are the primitive forms. Although the complete history of the prothallia was not made out, that of the sex organs was obtained. The antheridia in structure most nearly approach those of Equisetum. The archegonia are on the under side, and in its development the embryo retains its direct upward growth and bursts through the prothallium which remains surrounding the base of the plantlet probably for almost a year, continuing to do vegetative work after the sporophyte is independent. The development of the archegonium neck was discussed, and the transition between the archegonium of bryophytes and that of pteridophytes suggested. The whole structure was taken to indicate the primitive nature of Marattia, and the author regarded it as the nearest form to the liverworts yet examined, especially approaching the Anthoceroteæ.

Discussed by Mrs. Britton and Messrs. MacMillan and Atkinson.

13. M. B. THOMAS: *The roots of orchids.*—In the absence of the author the paper was read by title.

14. L. H. PAMMEL: *Preliminary notes on some chromogenic bacteria of the Ames flora.*—In the absence of the author the paper was read by title.

15. B. T. GALLOWAY: *Results of some recent work on rust of wheat.*—In the absence of the author the paper was read by title.

MONDAY MORNING, AUGUST 21.

16. THEOBALD SMITH: *Further observations on the fermentation tube with special reference to anaerobiosis, reduction and gas production.*—The different forms of the group of Bacillus coli produce gas when glucose is present in the culture medium, and in about equal amounts and equal rapidity. They have a varying behavior toward other sugars, however. The introduction of potash shows that about one-third of the gas produced is carbon dioxide, and the remainder of the gas is explosive, being probably hydrogen. Methylene blue put into the fermentation tube will be decolorized by the growth of the germs, but when mixed with air the fluid becomes colored again. The classification of bacteria into those causing alkaline and those causing acid reaction of the medium is not tenable, as these changes depend upon the nutritive constituents of the medium.

Mr. Lasché stated that he had found what he took to be a loss of albuminoids during such fermentation, and that no sugar was withdrawn; but that he was not yet prepared to defend this view.

17. JOHN G. JACK: *The fructification of Juniperus.*—Much uncertainty of statement existing concerning the length of time involved in fructification, the author studied J. Virginiana, J. Sabina, var. procumbens, and J. communis. He found that the fruit matured in one, two, and three years, in the order given. The morphology of the so-called "ovule" was also discussed. [The paper will be published in full in the GAZETTE.]

18. S. G. WRIGHT: *The minute structure and development of the motile organ in the leaf of the red-bud.*—An historical sketch of the subject was given and the anatomical structure of the pulvinus. The leaf begins to rise at three A. M., reaches a maximum at nine A. M., then falls, reaches a second maxium at two P. M., and then falls until at ten A. M. it reaches its full "sleeping" position. The arrangement of tissues in petiole and pulvinus was described. The pulvinus was said to be a development of parenchyma cells about the petiole, corresponding in time and method of cell-division to the mesophyll cells. All the tissues of the pulvinus are so arranged as to secure movement with the least possible expenditure of energy.

MONDAY AFTERNOON, AUGUST 21.

19. ERWIN F. SMITH: *Two new and destructive diseases of cucurbits.*—The first disease was observed in melons in Michigan, and is produced by a parasitic Alternaria, which was separated and cultivated upon agar-agar. Artificial infection was obtained by sowing the spores from the pure cultures. It produces large brown spots on the foliage, and has been called "rust." Although very destructive to melons, it does not appear to affect cucumbers. The second disease attacks cantaloupes and cucumbers, and is specially characterized by a sudden wilting of the foliage. Much of this wilting is due to cutting off the water supply from the parts beyond by the disease extending into the stem. It is produced by bacteria, which have been separated, and artificial infection produced. Cut stems from diseased portions, when put into moist air, exlude viscid drops filled with bacteria. The spread of the blight is associated with the puncture or eating of the plant by insects, and is most abundant in dry weather when leaf-eating insects are common. Bordeaux mixture proved wholly ineffective as a preventive.

The paper was discussed by Messrs. Arthur and Jones.

20. CONWAY MACMILLAN: *Preliminary statement concerning botanical laboratories and instruction in American universities and colleges.*—Circulars were sent to all American universities and colleges, but the result was not entirely satisfactory. In some cases no information could be obtained, in others the information was vague. The author rapidly sketched the offered courses and equipment in the various colleges from which information had been obtained, showing a remarkable inequality in the presentation of botany. It was stated that the united herbaria of the country represented about three million specimens, and the united botanical libraries from 230,000 to 250,000 volumes. Broadly speaking, the colleges could be divided into three groups on the basis of botanical instruction: (1) those which do such work as that offered by Gray's "Lessons" and the "analysis" of a few flowers; (2) those which simply study types, after the Huxley and Martin method, and have little or no botanical tendency; (3) those with well-developed courses in all the various phases of botanical activity.

In consequence of the discussion which followed, participated in by Messrs. Bessey, Barnes, Underwood, Keller-

man, Britton and others, a resolution was passed requesting the Commissioner of Education to publish a monograph on the subject, to be prepared by Professor MacMillan.

A motion was also passed for the appointment of a committee to report at the next annual meeting of the section concerning some feasible way by which the section might use its influence in securing better botanical instruction in secondary schools. J. M. Coulter, D. H. Campbell, and N. L. Britton were appointed.

21. BYRON D. HALSTED: *The shrinkage of leaves in drying.*—Contact photographs of fresh leaves, with the leaf from which they were taken dried and mounted at one side, were exhibited. These showed the exact amount of shrinkage in each instance, which was often surprisingly large.

Mr. Kellerman thought the specimens were more shrunken than usual in herbarium specimens. Mr. Swingle thought the matter an important one in connection with transpiration experiments, in which the measurement of the area of the leaf is often deferred until it is dry. Mr. Jack spoke of using cotton to fill under rigid stems in the press, in order to make the leaves dry smooth and flat.

22. J. H. PILLSBURY: *On the quantitative analysis of the colors of flowers and foliage.*—In the absence of the author the paper was read by title.

TUESDAY MORNING, AUGUST 22.

23. S. M. TRACY: *Distribution of the Gramineæ in the United States.*—There are 112 genera in our territory. The distribution of the more important species, both indigenous and introduced, was traced and maps were shown.

24. N. L. BRITTON: *A consideration of species based upon the theory of evolution.*—The earth's flora was comparatively uniform to the end of the carboniferous period, and nearly as much so up to the close of the cretaceous. The segregation into various floras has thus taken place in comparatively recent times. This should make one hesitate in calling closely related forms one a variety of the other, rather than two incipient species.

Mr. Coville thought that for the proper advancement of systematic botany closely related forms should receive ample consideration. Whether it is possible to consider forms which do not intergrade as good species, and those which do as varieties, must yet be determined by working botanists.

25. ELIZABETH G. BRITTON: *A revision of the genus Physcomitrium.*—Physcomitrium pyriforme of the Manual is not P. pyriforme of Europe, but is P. turbinatum, which proves to be our most widely diffused species. An interesting new species is also described from California under the name P. sphærotheca. Instead of six species in the United States, there are probably nearly double that number. Florida forms of this genus are probably referable to three distinct species.

Mr. Barnes thought the separation of P. turbinatum from P. pyriforme well taken.

26. W. T. SWINGLE: *Cephalurus mycoidea and Phyllosiphon sp., two parasitic algæ new to North America.*—The latter of these algæ was gathered in the Dells of the Wisconsin river, three days before (Aug. 19th), and heretofore known only from a few places in Europe. It forms pale spots upon the leaves of Arisæma, and is probably widely distributed. The alga is a genuine parasite, living within the tissues of the leaf. The suggestion is made that this habit may explain one way in which fungi have been derived from algæ without having passed through aquatic forms. The first alga mentioned is a parasite upon Magnolia, and has been found in this country before by lichenologists, but not reported.

TUESDAY AFTERNOON, AUGUST 22.

27. FREDERICK V. COVILLE: *An analysis of the conditions affecting the distribution of plants.*—The environmental conditions of plants, when reduced to their lowest terms, are heat, light, water, food, air and mechanique.

Mr. MacMillan thought it would be well to include evolutional factors, including the energy of the plants, which are not provided for in the classification. Mr. Swingle called attention to the important part played by fire in determining distribution. Mr. Coville explained that this was not classified as an ultimate condition, but was put under heat. He also said that tension, as used by MacMillan, was included under mechanique.

28. J. C. ARTHUR: *Deviation in development due to the use of unripe seeds.*—It was shown that immature seeds bring about weakness in the seedlings, causing a greater number than usual to die before becoming established, a lack of vigor that is never fully recovered, and an increased development of the reproductive over the vegetative parts, causing a comparatively greater fruitage. It was pointed out that such

changes could also be brought about by any agency that lowered the vitality of the plant.

Discussed by Messrs. Bolley and MacMillan. [The paper will be published in full in the *American Naturalist.*]

29. W. T. SWINGLE: *The principal diseases of citrous fruits now being studied at Eustis, Fla.*—A trouble characterized by wilting shows well at a distance, but the microscope gives no additional information. It is thought to be due to some physiological check to transpiration. Mal di goma is a common disease connected in some way with a lack of proper respiration at the roots of the tree. "Die back" is a disease marked by a great variety of symptoms. The name is due to the usual dying back of the ends of the branches. Fruit and leaves are also affected. It is known to be increased by excess of nitrogen in the soil. A local disease of less importance than the preceding causes corky excrescences upon the fruit.

30. P. H. ROLFS: *A sclerotium disease of plants.*—Especially affects tomato, potato, egg-plant and melons, but has been found in seventeen species belonging to widely different orders. Sclerotia are abundantly formed in the stems near the ground, which give rise to mycelium on culture media, but not to spores. The relationship of the fungus has not been determined.

31. ELIZABETH G. BRITTON: *Ulota Americana* Mitten *and Orthotrichum Americanum* Beauv.—Dealt altogether with the tangle of synonymy in which these names are involved.

32. L. H. PAMMEL: *Notes on Roestelia pyrata.*

33. L. H. PAMMEL: *Crossing of cucurbits.*

34. L. H. PAMMEL: *A case of poisoning by the wild parsnip, Cicuta maculata.*

In the absence of the author these papers were read by title.

Proceedings of the Botanical Club, A. A. A. S., Madison meeting.

FIRST SESSION, FRIDAY, AUGUST 18, 9 A. M.

The Club was called to order by Vice-president W. A. Kellerman, the president, W. P. Wilson, and Secretary, T. H. McBride, both being absent. Mr. W. T. Swingle was

made Secretary *pro tem.* and served throughout the sessions. About thirty persons were present, and the attendance ranged from thirty to fifty for the subsequent sessions.

The report of the standing committee on nomenclature, to which had been referred the preparation of a check-list, was called for, and presented by its chairman, Mr. N. L. Britton. The manuscript, almost ready for the printer, was presented, but before printing was ordered, the committee made certain recommendations, which were considered *seriatim:*

1. That the rules of nomenclature adopted at Rochester be so amended as to permit the retention of a specific name even when it involves a duplicate binomial, and also when it conflicts with a later specific name described in the genus to which it has been transferred. The two parts of the recommendation were taken up separately; that which referred to duplicate binomials receiving the larger share of attention. This unanimous recommendation of the committee was made as a result of their work upon the check-list, although one year ago they were as unanimously opposed to it. The recommendation was fully discussed by Messrs. Bessey, Coville, Greene, MacMillan, Britton, Coulter, Kellerman, Swingle, Seymour, Davis, Atkinson, and others, the impression prevailing that the principle of the permanency of the specific name is more important than that of homonyms. The recommendation in favor of duplicate binomials was adopted by a very large majority. The recommendation favoring the retention of the older specific name when transferred to a genus in which the same specific name had been subsequently used, after brief discussion and explanation, was also adopted.

2. That the sequence of orders in the check-list be that of Engler and Prantl's *Die natuerlichen Planzenfamilien.* This was unanimously adopted, not that the sequence referred to is in all respects the best, but because it is at present the most convenient presentation of a natural arrangement.

3. That precedence in the same volume be regarded as priority. Unanimously adopted.

4. That the varietal name be subject to the same laws of permanency as those which govern the specific. In the discussion which followed Messrs. Britton, Greene, Coville, Smith, (E. F.), Underwood, Coulter, Atkinson, Seymour, and Mrs. E. G. Britton, took part, and the Club adjourned without reaching a vote.

SECOND SESSION, MONDAY, AUGUST 21, 9 A. M.

The second session opened with thirty-five persons present. The treasurer's report was read, showing a deficit of about six dollars, which was subsequently more than covered by voluntary contributions from the members. A committee formed of A. S. Hitchcock and E. F. Smith to nominate officers for the ensuing year was then appointed, to report on Tuesday.

Papers or brief addresses were presented as follows:

MRS. E. G. BRITTON: *The genus Bruchia.*—The mosses of this genus are minute, and mostly American; only two types had to be sought in Europe. The work brought out several new species, and the doubtful ones were noted.

MRS. E. G. BRITTON: *The necessity of seeing types.*—A number of instances of the imperfection of descriptions, and of otherwise unobtainable information secured from the original specimens, were given, emphasizing the fact that even in the case of the most conscientious and careful botanists the examination of their type specimens is sometimes required for identification.

Mr. Greene thought that the necessity for seeing types grew largely out of the imperfect use of the English language and a lack of appreciation of what constitutes true characters, in the Linnæan sense. Mr. Underwood spoke of the difficulty sometimes experienced in ascertaining where types are to be found, and mentioned the Mexican collections stored in Paris. Miss Harrison spoke of the types in the National Herbarium at Washington, and further remarks were made by Mr. Kellerman.

A. S. HITCHCOCK: *The forms of Ampelopsis.*—Fresh specimens of *Ampelopsis quinquefolia* were exhibited and attention called to the form which does not climb. The leaflets are stalked and taper to the base, the cymes are dichotomous (not racemose), the canes smooth and of different color, discs only rarely present (flowers not studied). Its characters are of the *Cissus* type, and he is inclined to think it a good species.

Mr. Swingle stated that he had found the form with discs well developed.

J. C. ARTHUR: *A centrifugal apparatus.*—The speaker exhibited a new pattern of centrifugal for demonstrating the sensitiveness of roots and stems of seedlings to centrifugal

force, an indirect way of explaining geotropism. A disc of cork, about five inches in diameter, to which the seedlings are pinned, and kept moist by constant dripping of water, is revolved from 400 to 1,200 revolutions per minute. The disc is enclosed to prevent evaporation, and is adjustable at any angle. The disc is run by a small electric motor and batteries.

D. T. MACDOUGAL: *The sensitiveness of tendrils.*—Read by Mr. Arthur. Many observations were brought forward to show that the supposed power of tendrils to discriminate between contact with their own organs and foreign bodies does not exist, and that even those of the most sensitive species often coil about other tendrils upon the same plant.

MRS. E. G. BRITTON: *The Jaeger collection.*—The speaker narrated the efforts which had finally been crowned with success, by which a very large collection of mosses, containing many valuable exsiccati had been obtained from Geneva, for the Columbia College herbarium.

W. A. KELLERMAN: *The distribution of some woody plants in Ohio.*—Among other items he noted that the umbrella tree is not a native of the state, although it has been so reported.

A. S. HITCHCOCK: *Observations on the pollination of Œnothera Missouriensis.*—The large flowers open just before dark, although the stigmas protrude as early as two o'clock in the afternoon. Only a single species of insect, a large sphinx moth, has been seen about the flowers. This comes about eight o'clock, and is active until darkness sets in.

ERWIN F. SMITH: *The serious prevalence of root diseases.*—Tumors upon the roots, of which the cause is not known, occur in various parts of the country, but especially in California, and prove very destructive to nursery stock of apricot, plum and peach, as well as to other and older trees.

The common occurrence and injurious nature of the disease in California was confirmed by Mr. Campbell.

D. H. CAMPBELL: *The prothallium of Botrychium.*—Specimens were shown by the speaker who spoke of its rarity in collections. It is of considerable size, remains attached until the plant is quite large, and yet might readily be overlooked, being mistaken for a part of the root system.

C. E. BESSEY: *The use of personal names for species.*—Linnæus made little use of them, there being less than one per cent. to be found in his Species Plantarum. In marked

constrast to this are the reports of the National Herbarium for 1891, containing twenty-three per cent., and for 1892, containing eighteen per cent. of personal specific names. It is well to honor great men by the dedication of genera, but in doubtful taste to make more than a sparing use of personal names for species.

Mr. Britton said that the name of the collector was often more indicative than that of the country, as the travels of the collector are at first more definitely known than the range of the species. In large genera it is often difficult to obtain other names that are truly descriptive. Mr. Seymour made reference to a collector who insisted that his new species should bear his name. Mr. Coulter thought that personal ambition had very little influence, and that the practice could be upheld to some extent by the advantage in giving a name that is not likely to be duplicated, even if transferred to another genus. Mr. Bessey said he only wished to protest against the abuse of the practice, and did not advocate its abolition.

The Club adjourned until Tuesday morning.

THIRD SESSION, TUESDAY, AUGUST 22, 9:15 A. M.

The report of the nominating committee was received, and confirmed, thus electing the following officers for the year 1894: Dr. Douglas H. Campbell of Palo Alto, Cal., President; Dr. N. L. Britton of New York City, Vice-President; and Mr. W. T. Swingle of Eustis, Fla., Secretary.

The report of the committee to prepare a check list was again taken up. Mr. Greene reminded the Club that this committee had sent out a circular letter in regard to capitalization and punctuation, which was not mentioned in the report. Mr. Britton replied for the committee that about sixty of the circulars of inquiry were sent out, and that about forty or forty-five answers were received. The committee itself stood four in favor of the older American usage of capitals, two in favor of modifying it so as to remove the capital from geographical specific names, and one in favor of complete decapitalization. The returns from the circulars gave fourteen in favor of the first method, five for the second and twelve for the last. In reference to the use of the comma between the specific name and the authority, four of the committee wished to abandon it and three to retain it, while the returns from the circular gave eighteen for discarding and thirteen for re-

taining it. In view of the rather even division of opinion the committee did not feel authorized to decide.

Mr. Greene offered a motion that the committee conform to the accepted usage in regard to capitals. To illustrate the necessity of this he cited the following illustration: Three of the species of Lythrum are L. alatum, L. Hyssopifolia and L. Thymifolia. The genus name is neuter, as shown by the neuter adjective "alatum." "Hyssopifolia" and "Thymifolia" are old substantives, but if the capital is reduced to lower case initial, they become feminine adjectives, which of course is inadmissible. After some discussion the motion was laid upon the table until such time as other members of the Club, who were interested in the subject, could be present.

The report of the committee appointed last year to consider the advisability of the establishment of an American botanical society was presented by Mr. Barnes. A letter from Mr. L. H. Bailey, chairman of the committee was read, as virtually the report of the majority in favor of abandoning the attempt for the present. Eight of the committee thought its organization by the Club impracticable, one favored the organization but offered no plan of procedure. Mr. Barnes, the remaining member, submitted the following report:

As a member of the committee appointed last year to report on the feasibility of forming an American botanical society I find myself unable to agree with the majority in reporting that such organization through the initiative of the Botanical Club is not feasible at present. Another member of the committee also dissents from the majority report, viz. Prof. F. Lamson-Scribner; but I am not able to say whether he would approve of the plan which I suggest, as I have had no opportunity of submitting the same to him.

At the time the plan was broached for the formation of a national botanical society I was not in favor of it, believing that the time was not yet ripe for such an organization. On thinking over the matter during the year past I have become convinced not only that the time is opportune, but that the Botanical Club, an open association of the loosest possible organization, can establish a restricted society without friction, and with great benefit to the science of botany.

I therefore submit the following suggestions in lieu of the majority report. I recommend:—

1. That the Botanical Club approves the formation of an American botanical society whose membership shall be restricted to those who have published worthy work and are actively engaged in botanical investigation.

2. That to this end the Botanical Club proceed to elect ten men who beyond all question should belong to a society so restricted.

3. That these ten be directed to select fifteen additional members who in their judgment fall well within the limits suggested.

4. That the twenty-five persons so chosen be invited to become the charter members of the botanical society, to proceed to organize the same, and to provide for the election of additional members by such methods and on such terms (not incompatible with the intent of recommendation 1) as they see fit.

On written ballot the report of Mr. Barnes was adopted by a two-thirds majority of the Club as a minority report, after a lengthy discussion by Messrs. Campbell, Britton, Halsted, Smith (E. F.), Seymour, Jack, Bolley, Coville, and others. Balloting (without nomination) for ten members of the new society was then begun, but not completed until the afternoon session.

J. C. ARTHUR: *A new auxanometer.*—The speaker exhibited a new form of self-recording auxanometer in which the registration is made upon blackened glass rods as they pass, at regular intervals, a bristle attached to the growing plant. He claimed that it was more readily adjusted, less easily deranged, and less expensive than the usual kinds. Permanent records are quickly secured by making blue prints from the rods.

W. T. SWINGLE: *The sub-tropical laboratory at Eustis, Fla.*—The building was described, with the aid of a ground plan. It was built, and an acre and a half of ground purchased, by the citizens of Eustis and fruit growers of the region, and presented to the U. S. Department of Agriculture. It is devoted to the study of the diseases of citrous fruits. There are six rooms, well lighted and provided with water, gas, compressed air, reagents and other facilities for research. One room is for a visitor's laboratory, where the visiting biologist will receive all facilities for work that the region can afford, except the use of a microscope, which he should bring with him.

W. T. SWINGLE: *A new Florida palm.*—The plant resembles the sabal palm, but has smaller leaves and different fruit. Like the sabal palm it has an underground development of stem, which serves to preserve it from total destruction by fire.

B. D. HALSTED: *A new form of Exobasidium.*—The species occurs upon Azalia and Andromeda. It is almost confined to the inflorescence causing it to enlarge, grow erect, and produce flowers with separate petals in place of the usual gamopetalous corolla. He also spoke of a Phyllosticta (*P. cruenta*), which follows a leaf miner upon *Polygonatum biflorum*, photographs of which were shown.

Adjourned to meet in the afternoon.

FOURTH SESSION, TUESDAY, AUGUST 22, 3:30 P. M.

At the closing session of the Club a final ballot for the first ten members of the new botanical society was taken, and the names announced. (See page 368.)

The deferred report of the committee on a check-list was taken up, and the motion which had been pending, recommending the usual capitalization of specific names was withdrawn. Mr. Barnes thought the matter of punctuation might well be settled. Mr. Bessey felt that neither in this or in capitalization should the printed list of the committee be considered final, but only tentative. Mr. Trelease and Mr. Greene thought it would be best to settle these points now. A motion to refer all unsettled matters to the committee with power to act was carried. Upon motion of Mr. Britton the committee was increased from seven to nine, and E. L. Greene and Wm. Trelease named by the chair as the additional members.

A. B. SEYMOUR: *Synonymy in the genus Valsa.*—Instances of badly mixed synonymy in this genus were given as an illustration of the tangle which sometimes has to be straightened out by the cataloguer. He also called attention to a key to the species of Cladonia prepared by F. L. Sargent, of which he showed blue prints prepared by himself.

B. D. HALSTED: *A case of infection of black knot of plum.*—The infection took place in 1892, the results appearing in June, 1893. There was good circumstantial evidence to show that it did not result from ascospores.

The paper was discussed by Messrs. Bolley and Brewer.

Papers upon the program by L. H. Bailey, W. W. Rowlee, D. T. Durand, C. V. Riley and B. T. Galloway, in the absence of the authors, were read by title.

Mr. Britton presented his resignation as vice-president of the Club for the coming year, on account of contemplated absence in Europe, which was accepted, and D. C. Eaton was elected to fill the vacancy.

The Club then adjourned *sine die*.

Proceedings of the Madison Botanical Congress.[1]

WEDNESDAY, AUGUST 23, 10 A. M.

The Congress was called to order in the Physical Lecture Room of Science Hall by Dr. J. C. Arthur, Chairman of the Committee on Arrangements.

The chairman gave an account of the origin of the present Congress, and the steps which had been taken to secure a full attendance, not only of American botanists, but also an adequate representation of foreign ones.

A committee consisting of Messrs. Bessey, Britton, MacMillan, Tracy and Davis, was appointed to nominate officers for the Congress, and a recess was taken until the committee was ready to report.

Upon reconvening the committee first offered the following resolution pertaining to the official name of the Congress, which was adopted without discussion:

"*Resolved*, that, inasmuch as the attendance of European botanists at this meeting has fallen much below the expectation of the organizing committee, so that the desired international character of the assemblage has not been realized, the name of the meeting be The Madison Botanical Congress."

The committee then presented the following nominations for the officers: For president, Edward Lee Greene, of Berkeley; for vice-presidents, Henry L. de Vilmorin, of Paris, and Lucien M. Underwood, of Greencastle; for secretaries, J. C. Arthur, of LaFayette, F. V. Coville, of Washington, and B. L. Robinson, of Cambridge; for treasurer, Charles R. Barnes, of Madison.

As Prof. Greene was not a duly qualified member of the Congress at the time, his name was withdrawn, and the other other nominations were unanimously confirmed. Subsequently his name was again presented for president and he was unanimously elected.

M. de Vilmorin presided during the remainder of the morning session.

A communication from the International Commission upon Nomenclature was read by the presiding officer, and was referred to the three American members of the International Commission.

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[1] As the report of the proceedings is to be published in full as soon as possible only an abstract is here given.—EDS.

A printed letter from Dr. Otto Kuntze, a copy of which had been handed to each member of the Congress upon registration was then presented, and was also referred to the American members the International Commission. The matter of the nomenclature of systematic botany being thus introduced to the Congress, it was voted that, inasmuch as the Congress did not possess the international character which had been hoped for, and could not therefore legislate upon questions of nomenclature, it should not further consider the subject.

A series of topics were presented by Secretary Arthur which had been suggested for the consideration of the Congress by various botanists, both American and foreign, a part having already been printed in the preliminary circular of the Committee of Arrangements.

The following committees were appointed to consider the topics named and to report at the next session of the Congress:

1. On the Nomenclature of Plant Diseases: B. D. Halsted, W. T. Swingle, and L. R. Jones.

2. On the Terminology of Anatomy and Morphology: D. H. Campbell, Conway MacMillan, and C. R. Barnes.

3. On the Terminology of Physiology: J. C. Arthur, W. T. Swingle, and A. S. Hitchcock.

4. On the Nomenclature of Horticultural Forms: W. Trelease, H. L. de Vilmorin, and B. L. Robinson.

5. On Bibliography: C. R. Barnes, N. L. Britton, and A. B. Seymour.

The attention of the Congress was called to the loss sustained by the botanical world in the death of Alphonse de Candolle, and George Vasey. H. L. de Vilmorin and F. V. Coville were appointed a committee to draft resolutions on the death of Alphonse de Candolle. N. L. Britton and C. E. Bessey were appointed a committee to draft resolutions on the death of George Vasey.

The Congress then adjourned until Thursday morning at ten o'clock.

In the afternoon, at two o'clock, fifty members assembled at the entrance of Science Hall, where carriages were taken for the excursion to Lake Wingra provided by the Local Committee of Arrangements. The afternoon was spent in examining and collecting specimens of the flora of the marshes, the dry morainic hills, and the edges of the lake. The trip presented an exceedingly varied flora which proved of much interest to those who participated in the excursion.

THURSDAY, AUGUST 24, 10 A. M.

The session was called to order by Vice-President Underwood, who, upon the election of E. L. Greene as President, surrendered the chair to him.

A telegram was read by Secretary Arthur from Prof. Wittmack, of Berlin, stating that his duties as judge at the Columbian Exposition prevented his attendance, and expressing his hearty good wishes for the Congress.

A committee on Geographic Botany, consisting of F. V. Coville, L. M. Underwood, and W. T. Swingle, was appointed to present this subject at the subsequent session of the Congress.

The report of the committee to draft resolutions on the death of Alphonse de Candolle was presented by M. de Vilmorin, adopted, and ordered engrossed, signed by the officers of the Congress, and transmitted to his family.

A committee on resolutions to express the appreciation of the members for the hospitality of the city was appointed: W. A. Kellerman, Miss S. M. Hallowell, and B. L. Robinson.

It was voted that discussion on the report of each committee be limited to one hour, and individual speeches to five minutes.

Report of the committee on Nomenclature of Plant Diseases was received.

The report was divided into seven sections, making suggestions for the limitation of common names now in use and the rules to be observed in applying new names.

After discussion by Vilmorin, Halsted, Swingle, Bessey, Jones, Britton, Arthur, Barnes, Kellerman, Seymour, Trelease, Coville, Carleton and Tracy, the report, after considerable amendment, was adopted.

A standing committee of seven, consisting of Messrs. Halsted, Swingle, Jones, Bessey, Kellerman, Atkinson and Galloway, was appointed to consider the subject and make a further report upon it.

A motion was passed directing all committees appointed by this Congress to report to Section G of the American Association for the Advancement of Science.

The report of the committee on the Terminology of Plant Physiology was read and partially discussed before the noon recess.

The committee reported four topics for discussion:

1. In reference to the terminology to be used regarding the several processes concerned in the use of food in building up the structure of plants. Four terms, assimilation, digestion, food, and the new term, photosyntax, were considered under this head.

2. The use of the terms fertilization, pollination, and fecundation. The committee recommended the abandonment of the term fertilization, and the use of the term pollination only to designate the transference of pollen to the stigma, and of fecundation to designate the union of the male with the female gamete.

3. The restriction of thd term *physiology* to the chemical and physical part of the general subject, and placing the remainder under the title *ecology*.

4. The limitation of species, varieties and forms. This topic was not discussed for want of time.

THURSDAY, AUGUST 24, 2 P. M.

The Congress was called to order with President Greene in the chair.

The unfinished business of the morning session, the discussion of the report presented by the committee on Terminology of Plant Physiology, was resumed.

As the work of this committee and the discussion which followed were only suggestive, the three members of the committee were empowered to select two others[1], and directed to report a tentative presentation of these matters as early as possible, in order that the substance of their report might be known before the next meeting of the American Association, at which time it is to be further considered.

The report of the committee on the Terminology of Plant Anatomy and Morphology was presented by Prof. MacMillan.

The committee recognized the great complexity of the matter with which they have to deal, and recommended to the Congress that a committee of five be appointed to take under more careful consideration the difficulties presented in the nomenclature of morphology. The committee brought to the attention of the Congress the difficulties in the present terminology respecting the structure of the stem, the use of the terms male and female as applied to the flower of phanerogams, and the terms used in designating the various parts

[1] MacMillan and Barnes were subsequently named.

of the sporophyte and gametophyte connected with reproduction. The committee also suggested the necessity of a general term to designate the product of fusion of two heterogametes.

After a brief discussion of the matters presented by the committee, its request for the appointment of a committee of five was concurred in. The original committee was continued, and Drs. Farlow and Thaxter were added to their number.

The report of the committee on the Nomenclature of Horticultural Forms was presented. The committee recommended:

1. That the nomenclature of the species and natural varieties used in forestry and decorative gardening should be treated by horticulturists precisely as they would be treated by botanists if found growing wild, and that they should therefore be subject to whatever rules by international agreement are adopted for general botanical nomenclature. Pending the adoption of such a code of rules, however, the names used in Nicholson's Dictionary of Gardening, so far as they go, should be used. In cases where Nicholson is insufficient, the Kew Index, now in course of publication, should be followed so far as it goes. In case of the displacement of familiar names these should be retained in parenthesis until both dealers and purchasers have become familiar with the change. 2. The nomenclature of florists' races and forms, as well as the more numerous artificial, and more or less transient forms of the fruit grower, vegetable gardener, and farmer, should be conducted on quite different lines from that of natural species and varieties, and all names used for such forms should be in the vernacular. Phrases should not be employed as names, and all such vernacular names should be limited to one, or at most two, words, avoiding high sounding or bombastic names, as well as those which have already been relegated to the list of synonyms. Priority of naming these forms should be recognized. Varieties and forms transferred to a country possessing a different language from that in which they were first named may be renamed, in case the name cannot be transferred directly to the language, the new name conforming so far as possible to the form and sense of the original name, and citing it as a synonym. For use in trade catalogues the names adopted in the official lists of various national societies should be adopted.

After brief discussion the report of the committee was adopted.

The report of the committee on Bibliography was then presented.

The committee make the following recommendations:

1. The publication of a current bibliography of American botany, comprising (*a*) a catalogue of papers by authors, (*b*) a catalogue of journals, (*c*) a list of acceptable abbreviations of authors' names; (*d*) an index of species, both new and old.

2. Rules for citations, of which the following may be taken as illustrative both of matter and typography:

Ramann, Waldbeschädigungen durch Flusssäure. Forst. Zeits. **2** : 245. Je 1893.

Fuligo septica.

Rosen, Beiträge zur Kenntniss der Pflanzenzellen. Beitr. Biol. Pfl. **6** : 247. *pl. 2. f. 5.* 1892.

Tulasne, Les Urédinées et les Ustilaginées. Ann. Sci. Nat. Bot. IV. **2** : 108. 1854.

Bolley, Prevention of potato scab. Bull. Exper. Sta. N. Dak. 9 : 27. 10 Mr 1893.[1]

The report was discussed at length by the Congress and was referred to a standing committee of five with power to act. This committee consists of Barnes, Seymour, Britton, Hitchcock and Mrs. A. F. Stevens. It was evidently the wish of the Congress to have the matters discussed in the report of the committee settled upon as early as possible, in order that the various indexes which are now in course of preparation or publication might conform to some general scheme of typography and citation.

A committee consisting of Bessey, Britton, and MacMillan, was appointed to bring before the Congress a proper memorial regarding the exposure of the United States National Herbarium to loss by fire.

The report of the committee on the death of Dr. Vasey was read, adopted and ordered engrossed, signed by the officers of the Congress, and transmitted to his family.

The report of the committee on Geographic Botany was presented. The short time for consideration at the disposal of this committee enabled it only to present in a very informal

[1] Number of part, heft, fascicle, etc., is only to be given when it stands alone. It replaces the volume number but is printed in ordinary face type.

manner the topics which should be considered at length by a standing committee. After a brief discussion of the points reported, the present committee was appointed to follow up the question and prepare a report, to be submitted to section G of the American Association.

The treasurer of the Congress reported receipts from dues, and expenditures for printing, postage and translation, leaving a balance on hand of $1.45. The report was approved.

Question was raised in regard to the publication of the proceedings of the Congress. Mr. Barnes announced that the amount of money which was raised for the entertainment of the A. A. A. S. would probably be in excess of their expenditures, and thought it probable that a sufficient sum would be granted by the Local Committee to provide for publishing the proceedings of the Congress. The secretaries were therefore authorized to prepare the matter for publication and have it printed, the members of the Congress to assume the remainder of the expense beyond that which may be provided for by the Local Committee of Arrangements.

The report of the committee on the National Herbarium was read. The report points out the unsafe condition of the present building in which the Herbarium is located, its unusual exposure to loss by fire, and the valuable character of the collections which are contained in it, and urges that steps be taken to provide an adequate and fire-proof building for its reception.

It was directed that the memorial be engrossed, signed by the officers of the Congress, and copies transmitted to the Secretary of Agriculture, the chairman of the committee on Agriculture in the House, and the chairman of the committee on Appropriations in the Senate, of the United States Congress.

The report of the committee on Resolutions was read thanking the citizens of Madison for their hospitable entertainment, and extending thanks to Dr. Otto Kuntze for the trouble and expense which he had incurred in providing this Congress with unusual facilities for considering the question of nomenclature of taxonomy.

The Secretary of the Local Committee invited the members of the Congress after adjournment to a moonlight ride upon Lake Mendota. The invitation was accepted by about sixty, who thoroughly enjoyed the two hours excursion.

At the close of the afternoon session the Congress adjourned *sine die*.

BRIEFER ARTICLES.

Botany at the World's Fair.—There is no separate display illustrating the science of botany at the World's Columbian Exposition. What good might have resulted from an adequate setting forth of the history, development, economic importance, apparatus and methods of modern botany can only be imperfectly surmised. The opportunity to let the public, as well as their co-laborers, know what the 3,000 persons who devote their energies to this science are accomplishing has not been seized.

There is, however, considerable material scattered through the Exposition of interest to botanists. But it is so widely separated, and in the main so difficult to find, that it is likely to be largely missed by those who would receive the most benefit from the display. The following brief account may be an aid to visitors, but it is necessarily imperfect. Several days were devoted to securing the data for the article, and yet the writer has reason to believe that many interesting and praiseworthy exhibits of a botanical nature were overlooked. He is also aware that important details could have been added about those seen, and must offer as an excuse for their absence the difficulty which one meets as a rule in securing information. Very few of the exhibits are accompanied by adequate information, sometimes they are entirely unlabeled, and as a rule the attendants, if they can be found, can add little, if anything.

The largest herbarium shown is that of the Botanical Division of the U. S. Department of Agriculture. This consists of several thousand mounts arranged in a large case, illustrating the very satisfactory and complete method in use in the Division. It includes flowering plants, vascular cryptogams and lichens, and is purely a scientific exhibit, without even a single sheet with its mount exposed to attract the attention of the public. It is situated near the northeastern corner of the Government Building.

In the gallery of the Horticultural Building under the dome are a number of excellent collections. The Montana State Commission display the state flora upon two handsome oak wall counters with heavy mirror-glass backs and a wide shelf above. There are fifteen ingeniously constructed portfolios, containing over 1,000 specimens, prepared by Prof. F. D. Kelsey, who has recently removed to Oberlin, Ohio. Some material was contributed by R. S. Williams, of Great Falls, Mont. One additional portfolio of specimens was furnished by Mrs. J. E. Light, and two more by Mrs. L. A. Fitch, who also displays some herbarium specimens on the wall of the science room in the Woman's Building. Ten large frames containing bouquets of dried flowers, prepared by Emil Starz, complete the display.

The Wisconsin State Horticultural Society shows twenty portfolios of plants mounted on blotting paper, and very imperfectly named. The preparation of this collection was evidently entrusted to wholly incompetent hands.

The Kentucky exhibit is mounted on herbarium sheets and placed under glass in swinging frames, as are many of the others yet to be mentioned. It was prepared by Prof. H. Garman and Mr. J. S. Terrill, and is classified as forest trees, grasses, ferns, and wild plants. Miss Sadie Price, of Bowling Green, Ky., exhibits some 500 pencil sketches of Kentucky plants, in part admirably colored, in connection with the preceding.

The Oregon exhibit, prepared by Drake and Gorman, is a large and interesting one, particularly notable for its handsome mounting, the swinging frames being supported by massive oak standards.

Miss Nettie Palmer, of Edison Park, Ill., shows a large collection, well mounted in swinging frames.

Mrs. S. B. Walker, of Castle Rock, Colo., has an interesting collection of about 500 specimens in swinging frames, although not fully named, and also a case of gift articles decorated with pressed flowers.

The Missouri Commission shows over 1,600 specimens, collected largely by B. F. Bush. They are displayed in white frames, which do not prove as pleasing as the oak frames chosen by most exhibitors.

The next largest number of herbaria are brought together in the science rooms of the Woman's Building. In this place Alida P. Lansing shows 1,100 specimens of Colorado plants in swinging frames. A common fault of this method of display is here very marked. The central frame work is not sufficiently rigid to support the heavy load of frames without sagging, and in consequence the frames swing strongly in one direction, making it very unpleasant to examine the specimens.

The Montana flora is illustrated by over 400 specimens, collected by various women of the state, and handsomely mounted in swinging frames, supported on a massive column with carved capital.

There are a hundred large sheets of Brazilian ferns mounted in swinging frames, collected by Mrs. James Watson Webb in 1867–68.

Mrs. A. M. Croley, of Tilsonburg, Ontario, Can., shows a large collection of ferns from all parts of the world. The sheets are loosely placed in wall cases.

Good herbarium specimens of Mexican plants, but not fully named, are distributed loosely in a large wall case. Neither the name of collector nor exhibitor is given.

A collection of red sea-weeds is also shown in these rooms, but no information about them could be obtained.

In the Mexican exhibit in the west gallery of the Liberal Arts Building is a collection by F. Altamirano of the National Medical Institute. The specimens are mounted on standard herbarium paper, and arranged in genus covers. They are intended to be placed in five shelf cases imitating finely bound books, which accompany them. A few sheets are displayed loosely in the show case.

In the Agricultural Building, the Colorado pavilion contains a collection of fine large specimens of grasses in swinging frames, from the State Agricultural College.

The Minnesota pavilion has over 170 oak frames filled with herbarium sheets of grasses and forage plants, disposed about the posts and desks.

In the exhibit of Agricultural Colleges and Experiment Stations, in the south-western corner of the same building, there is a small herbarium case of about twelve pigeon-holes containing mounted specimens, also about 100 sheets of Scribner's American grasses in swinging frames, and about fifty of Halsted's American weeds placed behind glass on partition walls. This exhibit also includes a most interesting display of plant diseases, by means of dried specimens, drawings, often colored, and outline maps giving distribution, mounted upon herbarium sheets, and placed behind glass upon partition walls. Diseases of garden crops and fruits comprise 112 sheets, prepared by Prof. S. M. Tracy, diseases of cotton and carnations, twenty-eight sheets, prepared by Prof. Geo. F. Atkinson, diseases of grasses and grains, sixty-six sheets, prepared by Prof. L. H. Pammel and Prof. H. L. Bolley, and the mildews of plants, forty-seven sheets, prepared by Prof. S. M. Tracy.

In the Washington State Building 150 swinging frames ranged along the wall of the south wing display 1,200 specimens of the state flora, prepared by Louis F. Henderson. The labels for the most part give considerable information regarding the occurrence of the species, and in this respect it is one of the best herbaria shown.

The exhibit of the Michigan Agricultural College, in the Liberal Arts Building, and of the Illinois University in the Illinois State Building each contains a tall pigeon-holed case partly filled with specimens, illustrating the construction of herbarium cases and the formation of an herbarium.

In the German exhibit in the Liberal Arts Building are two volumes by Hieronymus and Pax entitled "Herbarium Cecidiologicum," being exsiccati of galls, also a volume of Paul Hennings' "Phycotheca

Marchica" bearing date of 1893, being fifty specimens of dried fresh-water algæ, and also a volume of handsome exsiccati illustrating Mr. Hennings' methods of preparing succulent flowering plants and fleshy fungi for the herbarium, which every collector and preparator should be sure to see. There is also here an interesting historical exhibit, probably the only one in the Exposition relating to botany, showing the way in which J. J. Rousseau kept his specimens. It includes a vellum-bound volume, about eight by ten inches, in which the plants are fastened with strips of gilt paper, some loose sheets of plants, a manuscript catalogue of his collection, and his list of signs used as abbreviations.

It is a significant fact that in only three places in the great Exposition does one run across the placard "Botany," one of these being at this place in the German exhibit, where some space is set apart for botany in the portion devoted to the German universities, one being in the exhibit of the Agricultural Colleges and Experiment Stations, where a botanist is constantly in attendance, and one in the University exhibit in the Illinois State Building.

The German botanical exhibit is largely from the Royal Botanical Museum of Berlin. Beside the objects already mentioned there are seven wall cases about twenty inches wide by four feet high filled with (1) the plants that ants inhabit, (2) principal German hymenopterous galls, (3) phytopterous galls, (4) dipterous galls, (5 and 6) large fungi from the German colonies in Africa, and (7) fragments from the tombs of Egypt, about 1700–1200 B. C., including wheat and barley grains, tubers of Cyperus, palm seeds, stolons of mint, and wreaths made of the leaves of Mimusops and petals of Nymphæa. The Botanical Institute of Breslau shows eleven photographic views of the grounds and some printed volumes. The Institute of Vegetable Physiology of Berlin shows colored models of the several developmental forms of Puccinia, Claviceps and Peronospora from designs by Dr. W. Zopf, and of Marchantia, pine seeds and seedlings, Primula flowers, structure of pine wood, etc., from designs by Dr. Carl Müller, all made by Brendel of Berlin. The same institution shows large microscopic sections of wood,and microscopic mounts showing the effect of light and gravity upon the growth of mycelium, prepared by Prof. L. Kny, and also a set of Kny's colored wall charts. The Botanical Museum of Kiel shows a dredge used for marine algæ by Dr. Reinke, and a published volume of his results.

It will be seen that while this is an interesting exhibit, it is not in any respect representative of the present state of botany in Germany.

On the same floor, which is a second limited gallery, reached by

stairways in the German section of the western gallery are models of Claviceps and Puccinia made by Paul Osterloh, of Leipzig, and colored wall charts with black back ground of flower dissections, published by Frommann and Morian, of Darmstadt (Fred. Buch, 1138 Milwaukee Ave., Chicago, agent).

A very large series of the Brendel models is shown by the manufacturer among the school supplies in the German section in the first gallery.

In the space devoted to botany in the exhibit of Agricultural Colleges and Experiment Stations in the Agricultural Building will be found, beside the collections already referred to, a fine set of thirty vials containing root tubercles of different species of Leguminosæ from the virgin soil of North Dakota, prepared by Prof. H. L. Bolley, a set of Halsted's weed seeds in vials, a full-sized model of the famous experiment conducted by President Clark, of the Massachusetts Agricultural College, in which a squash was made to lift a weight of 5,000 pounds as its size increased by growth, and also a model of the present vegetation house and laboratory building of that institution. There are a number of standard seed testers shown by the North Carolina experiment station, a universal stand for photographing flowers, fruits, microscopic preparations, etc., devised by Prof. F. L. Scribner, sixty-two bromide enlargements, 12 by 14 inches, from photographs by Prof. L. H. Bailey, illustrating the effects of crossing the egg-plant, tomato, corn, cabbage, cauliflower, turnip, squash, gourd, coleus, phlox, etc., and preparations by Prof. F. H. King showing the distribution in the soil of the roots of common cultivated plants.

In the same exhibit is a case devoted to physiological apparatus exhibited by J. C. Arthur, showing twenty-three pieces, a few of which are imported, and a part made from original designs. It appears to be the only display illustrating vegetable physiology in whole or in part in the Exposition.

Photographs of thirty-four American and forty-eight foreign botanists are shown at this place. A still larger number, however, are shown in the exhibit of the Michigan Agricultural College, in the Liberal Arts Building, where photographs may also be seen of the grounds and botanic garden of that institution.

Some excellent photographs, 4 by 5 inches, of plant galls and the larger fungi, are exhibited by Miss Cora H. Clark, of Jamaica Plain, Mass., in the Science Room of the Woman's Building. There are many fine bromide enlargements of views in the Botanic Garden of Sidney, New South Wales, in the gallery under the dome of the Horticultural Building, and also five views of the botanical garden of the Royal University of Tokio, in the same room.

Photographs of the laboratories and of students performing various experiments are shown in the exhibit of Purdue University in the Liberal Arts building, giving a very complete idea of the facilities of this institution for teaching botany, especially when taken in connection with the apparatus shown in one of the cases.

Harvard University in the same building shows a case of the handsome glass models of flowers from the Ware collection, which now numbers 400 species, and will eventually number 1200 species or more; also a case of fibers, handsomely mounted; 20 fine illustrations, 10 by 12 inches, very faithfully colored, from a forthcoming work on North American fleshy fungi by Prof. W. G. Farlow; and a set of the published writings of Dr. Gray.

The Illinois University has, in the State Building, the most complete exhibit to illustrate the teaching of botany to be found in the Exposition. It contains a working desk for an undergraduate student and one for an investigator, a series of microscopes formerly used and a series now in use, sets of microscopic slides, photomicrographic enlargements, apparatus for photomicrography, sets of reagents and stains, a very full bacteriological outfit with living cultures, an herbarium previously referred to, museum specimens, a set of reference books, card catalogues, and many other things that can not find place here. Across the aisle in the display made by the Experiment Station of that institution is a long case showing diseases of cultivated plants, and a collection of seeds of wild plants.

The Division of Vegetable Pathology in the Government Building makes a very creditable display of its work, showing wax models of diseased fruits and leaves, large photographs to illustrate treatment, bacteriological and microscopical apparatus, and a set of slides revolving under a microscope, which last proves a very attractive feature to the public.

The agricultural schools of France are represented in the Agricultural Building near the southwestern corner. Here one will see models of grape seeds, each about two inches long, showing twelve types of grape seeds, and plates illustrating grape diseases, shown by Prof. Viala, of the school of Montpellier; a set of twenty-four specimens illustrating plant diseases, a wall chart of fungi, and a record of important discoveries made at this school, dating from 1807 when Prevost ascertained the nature of the bunt of wheat and proposed the copper sulphate remedy, later discoveries being made by Tulasne, Duchartre, Millardet and Prillieux, the exhibit being made by Prof. Prillieux, of the National Agricultural Institute; and finally seven student's herbaria of about one hundred specimens each, from the school at Sartilly.

If one is interested in fibers, the Exposition offers many opportunities for studying them. One should especially see the exhibit of Paraguay in the Agricultural Building and of the Section of Fiber Investigation in the Government Building.

A very beautiful exhibit of skeletonized leaves and seedpods is shown by Mrs. A. M. Croley in the science room of the Woman's Building

A fine large set of fungi of more than usual interest is shown by C. H. Peck, of the New York State Museum, in the gallery under the dome of the Horticultural Building. Models of fungi rather crudely colored and fancifully arranged are shown by the division of microscopy in the Government Building.

There are numerous extensive displays of medicinal plants in jars, often accompanied by herbarium specimens, of which the best are shown in the Government Building by the Department of Agriculture, in the Agricultural Building by Paraguay, in the western gallery of the Fine Arts Building by Mexico, and in the Costa Rica building.

The Forestry Building contains much of interest to botanists. The displays made by New York, North Carolina, Ohio, and Russia should be especially examined. The last has a new device for showing herbarium specimens of trees.

There are many collections of grasses tied up in bunches. Such may be seen in the western wing of the Illinois Building, in the Division of Botany in the Government Building, and in the Wyoming and North Dakota pavilions in the Agricultural Building. The latter is especially complete as a state exhibit, containing, beside the sedges, 124 species of true grasses belonging to forty-nine genera, of which eighty-eight species are native of the state. It is well displayed in heavy oak cases.

Large and interesting displays of bacteriological apparatus are made by the German universities in the gallery of the Liberal Arts Building, the U. S. Hospital Service at the south end, and the Bureau of Animal Industry on the east side of the Government Building. The last two also maintain laboratories and show many kinds of living cultures as does also the bacteriological laboratory for milk and butter in the exhibit of Agricultural College and Experiment Stations in the Agricultural Building.

A very large number of paintings in water colors of the flora of Australia, each about eighteen by twenty-two inches, is displayed on the walls of the New South Wales Building. The artist is Mrs. Rowan, who is expected at the fair the latter part of August. The collection is a unique and beautiful one, and is for sale at a valuation of $25,000.

At the west entrance to the central pavilion of the Art Palace is a

large bas-relief in plaster of Linnæus, by Jacob Eriksson, of Stockholm. The figure is life size, and shows the father of botany leaning against a tree admiring a wild flower in his buttonhole. The pose is admirable, and the expression just what a person familiar with the character of the great naturalist will regard as best portraying his nature. In the arch above is crouching Flora with an armful of flowers. The piece is valued at $1,500. It has been secured by a Swedish gentleman of Chicago and will be presented to the Chicago Art Institute at the close of the Exposition. The sculptor is now in Paris executing the same piece in marble to be placed in the Museum of Stockholm.—J. C. A.

EDITORIAL.

ALL BOTANISTS who wish to promote the interests of this vast science in America (and who does not) must feel gratified at the outcome of the gatherings of botanists in the latter part of August at Madison. For almost two weeks daily meetings were being held with which botanists were more or less closely identified. Numerous papers of scientific importance were presented at these gatherings. Section G, the new section of botany colonized from section F, was one of the busiest of the sections. Thirty-four papers were presented before it, and only thirty-five before the long established and popular section of anthropology.

BUT OUR GRATULATION is based not so much on the number and character of these papers as upon the amount of work undertaken not for selfish ends but for the purpose of advancing the interests of botanical research and instruction, and especially upon the unanimity with which all these schemes were undertaken. This spirit of cordial coöperation is one of the most promising evidences of the good-fellowship which seems to characterize botanists more than some other scientific groups we could name. The manifestation of it at these Madison meetings has been even more marked than at Rochester last year when we commented upon it. It is to be hoped that the feeling here is only the precursor of a similar sentiment of international scope.

THE SUSTAINED INTEREST in these annual gatherings is also noticeable. Although the attendance upon the American Association as a whole fell far below expectations, the registration scarcely reaching 300, the number of botanists present was almost if not quite as great as at Rochester. It is safe to say that the number of botanists in Madison did not fall much short of one hundred.

TWO MATTERS of special importance with reference to the teaching of botany were taken in hand by section G. At the request of the committee on program, Professor MacMillan had prepared a paper on the present condition of the teaching of botany in colleges and universities. The facts presented, though only a summary of the information collected, proved to be of such interest that Professor MacMillan was invited to continue his work in this direction; and the Council approved the resolution sent to it by section G, asking that the Commissioner of Education print the report as a Circular of Information. The section also asked the Council to appoint a standing committee on instruction in botany in secondary schools, which was done. We hope this committee will be active.

THE BOGY of taxonomic nomenclature was not obtrusive enough to trouble the gentlest histologist. The Botanical Club increased its committee on nomenclature by adding to it Messrs. Trelease and Greene, and referred the minor questions to the committee with power. The Check List which the committee has prepared was ordered printed and enough copies were subscribed for to insure the early accomplishment of this work. The Club also endorsed by a large majority the plan for the formation of a restricted botanical society, to membership in which amateurs and the younger men might look forward as a distinct honor. For it is to be only after a man has won his spurs by worthy work that he can become a member.

IN SPITE of the fact that the attendance of foreign botanists at the Congress was almost nil this gathering must be counted a distinct success. It has at least taken the initiative in much important work relating to usage, and if the committees follow up the work as some of them will undoubtedly do, we may look for some good results. But even if none of them does what it was appointed to do, the discussions which occurred upon the reports of the various committees on program cannot fail to be of much help to those who participated in them or heard them. It is to be noted that these discussions were peculiar in that they were based upon the working knowledge of the members of the congress, and not upon the research of one who had investigated the subject thoroughly. All therefore stood practically upon the same plane. Whatever disadvantages that method may have had, it had the distinct advantage of opening the mental eyes to one's limitations, and of seeing what the workinge knowledg of some of the most active American botanists amounted to. The showing was creditable. We should have had no occasion to be ashamed had Germany and England and France been well represented. Moreover the wide range of topics discussed must have had the effect of increasing one's appreciation of the scope and complexity of the science of which we delight to declare ourselves disciples, though each can know only a small part of it.

CURRENT LITERATURE.

A new text-book of botany.

The last (fourth) edition of Sachs' admirable text-book, a work which marked a distinct era in the teaching of botany, appeared in 1874, and owing to the rapid advances of the science, great need has been felt for some time for a revision of the work or of a new work to take its place. The author himself, having long since abandoned all hope or even desire to revise the work in its original form, published a work about ten years ago covering the physiological portion, and somewhat later Prof. Goebel wrote a work covering the part upon special morphology. These greatly enlarged portions still left a strong demand for a general text book of moderate size. The publisher, to whom the botanical public is greatly indebted for bringing out many works of the highest merit, made a special effort in 1890 to secure a new edition of the text-book. He urged the task upon Prof. A. B. Frank of Berlin, who was in many ways admirably fitted to undertake it. The offer was finally rejected upon grounds substantially the same as those that had influenced Prof. Sachs long before: i. e., that even the plan of the work needed changing, making it equivalent to writing a new treatise.

A new treatise, however, was at once undertaken, and to-day we have in Frank's *Lehrbuch der Botanik*[1], a work that presents the general subject of botany as nearly along the lines laid down by Sachs' text-book as could probably be attained at the present time, and yet presenting the freedom of treatment and freshness of matter of a thoroughly independent work. It is in two volumes, the first containing anatomy and physiology and the second, morphology and classification. A single index is made to serve for both. Some of the illustrations have already appeared in Sachs' textbook, but many also are new.

A feature of the work that is indicative of the change that has taken place in the recent relative development of the main departments of botany, is the comparatively large space given to physiology. Only one third of the first volume is devoted to the discussion of cells and tissues. This portion of the work is well done, but presents no specially new features. The remaining two thirds of the volume are devoted to physiology and it is in this part that we find the most characteristic and interesting portions of the author's labor.

[1] FRANK, A. B.:—Lehrbuch der Botanik nach den gegenwärtigen Stand der Wissenschaft. Vol. I, Zellenlehre, Anatomie und Physiologie. 669 pp. 227 illust. 1892. Vol. II, Allgemeine und specielle Morphologie. 431 pp. 417 illust. 1893. Leipzig, Wilhelm Engelmann. Roy. 8vo. Marks 29.

Physiology is defined as the physics and chemistry of living objects. The external conditions and agents, such as heat, light, electricity, gravity, water, oxygen, contact of solid bodies, and symbiosis, are first taken up. The last topic occupies twenty pages, and is a feature of the work that every botanist will desire to examine. Symbiosis is distinguished as antagonistic (parasitism) and mutualistic. The latter is again separated into disjunctive (illustrated by the reciprocal benefits in insect pollination) and conjunctive (illustrated by lichen symbiosis, ectotropic and endotropic mycorhiza, and by the presence of algæ within some higher plants). Several well drawn figures illustrate the ectotropic mycorhiza of beech and hornbeam, and of the endotropic mycorhiza of Ericaceæ, Orchidaceæ and Leguminosæ.

Under physical properties and phenomena the movement of protoplasm, water and gas, the mechanical, optical and electrical peculiarities,and the many phases of growth and movement are very fully treated. It will be remembered that Frank originated the terms heliotropism and geotropism, which apply to two of the most interesting characteristics of plants.

The chemical portion of the subject includes respiration, fermentation, the numerous classes and kinds of vegetable compounds, and the extensive topic of nutrition. The last has made wonderful development in the past few years, and the author having been one of the most active of investigators in this line, makes this one of the most interesting portions of the work.

The physiological part of the first volume closes with a chapter on reproduction, heredity, etc.

The second volume opens with fifty pages of general morphology, and the remainder is devoted to special morphology and classification.

The following outline will give the main features of the classification adopted by the author.

I. Thallophyta:
   1. Myxomycetes.
   2. Schizophyta (includes nostoc, oscillaria, etc., and bacteria).
   3. Peridinea (small, mostly marine, flagellates).
   4. Diatomaceæ.
   5. Algæ (in five classes, one being Characeæ).
   6. Fungi (in three classes).

II. Archegoniatæ:
   1. Muscinei.
   2. Pteridophyta (in four classes, one entirely fossil).

III. Phanerogamæ:
   1. Gymnospermæ (in four classes, one entirely fossil).
   2. Angiospermæ.

Lichens in this classification are distributed under the discomycetous, pyrenomycetous and basidiomycetous fungi, the larger part falling under the first. Angiospermæ are divided into only two subgroups: Archiclamydeæ and Sympetalæ,the former including the Polypetalæ and most of the Apetalæ, and the latter the Gamopetalæ, as heretofore classified.

The citations of literature throughout the work are grouped at the end of each subject. There are three unusually full indexes, one of illustrations, one of subjects and one of plant names.

The work is a valuable addition to the present list of textbooks of botany. One can only regret that it is not also published in the English language.

NOTES AND NEWS.

CARL FRIEDRICH NYMAN, the author of the useful Conspectus Floræ Europææ, died recently in Stockholm.

DR. DIETRICH BRANDIS, the well-known forest botanist, has been called to a professorship in the University of Bonn.

PROFESSOR A. von Nordenskiöld, of Stockholm, has been elected a member of the Academy of Sciences at Paris to fill the place made vacant by the death of Alphonse DeCandolle.

THE EDITORIAL STAFF for the new "Standard Dictionary of the English Language," shortly to be published by Funk and Wagnalls Co., New York, includes the following botanists: F. H. Knowlton, Erwin F. Smith, David White and W. T. Swingle, all of Washington, D. C., in charge of botany, and A. A. Crozier in charge of pomology.

THE COMMITTEE of ten selected by the Botanical Club met on Wednesday morning, August 23, 1893, and, having previously prepared their first ballots proceeded to elect fifteen additional persons to become charter members of the American botanical society. Twelve were elected on the first ballot and the remaining three on the second. The following are the names of the twenty-five charter members:

Arthur, J. C.	Coulter, J. M.	Robinson, B. L.
Atkinson, G. F.	Coville, F. V.	Sargent, C. S.
Bailey, L. H.	Eaton, D. C.	Scribner, F. L.
Barnes, C. R.	Farlow, W. G.	Smith, J. Donnell.
Bessey, C. E.	Greene, E. L.	Thaxter, R.
Britton, N. L.	Halsted, B. D.	Trelease, W.
Britton, E. G.	Hollick, A.	Ward, L. F.
Campbell, D. H.	MacMillan, C.	Wilson, W. P.
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(3) The Preliminary Catalogue of the Anthophyta and Pteridophyta reported as growing within one hundred miles of New York, 1888. Price, $1.00.

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